Amendment to the drawings:

Please add new Figure 2, which illustrates the disclosed method steps of superposing, applying heat or pressure, and peeling.

REMARKS

This is in response to the Office Action that was mailed on December 8, 2006. Claims 1, 3, 7, 9, 13, 15, 19, and 21 are reworded to clarify the relationship between the surface roughness of substrates and organic layers in the context of the present invention. The glass transition feature in claims 1, 7, 13, and 19 is based upon such disclosure as that appearing in lines 17-22 on page 22 of the specification. Minor formal amendments are made to claims 6, 7, 12, 18, 19, and 24. No new matter is added by this Amendment. Claims 1-24 are pending in the application.

Information Disclosure Statement

At the top of page 2 of the Office Action, the Examiner refers to a listing of references in the specification. The Examiner's comments regarding listing of references apparently refers to listings such as that on page 15 of the specification. It is noted that the reference discussed in the Background of the Invention section of the specification was cited in the Information Disclosure Statement filed herein on March 30, 2004.

Drawings

The Examiner has required a drawing showing method steps recited in the claims. Applicants present herewith Figure 2, which depicts a flow diagram that complies with the requirement stated by the Examiner.

Specification

Objection was raised to the disclosure because "no units are provided for the measurements of surface roughness or film thickness." Applicants respectfully point out that the precise actual thickness of the organic layer or the actual roughness of the substrate are do not matter in the context of the present invention. What is important is that - whatever the thickness of the organic layer - the roughness of the substrate layer be no more than "half' thereof ("50" versus "100"). For the convenience of the Examiner, it is pointed out that actual thicknesses are disclosed e.g. on page 36 of the specification.

Claim rejections - 35 USC § 112

Claims 1, 3, 7, 9, 13, 15, 19, and 21 were rejected for their recitation of the language "assuming that". This ground of rejection is respectfully traversed. In their immediate context, the claims recite the phrase "assuming that the thickness of said organic layer is 100." In their broader context, this simply - and clearly - provides a basis for comparison of two layers to one another. One layer is the organic layer mentioned, which is stated to have a thickness of "100." The claims go on to compare the roughness of a substrate layer to the thickness of that organic layer. Assuming that the thickness of the organic layer is 100, the roughness of the substrate layer is specified to be "0 to 50." Thus, it does not matter what the actual thickness of the organic layer is in this context. What is significant is that - whatever the thickness of the organic layer - the roughness of the substrate layer is no more than "half' thereof ("50" versus "100"). Applicants respectfully submit that this is made clear by the present amendment of the claims.

Claims 1-24 were rejected as allegedly omitting the description of the means for measuring the surface roughness. Applicants respectfully submit that the alleged omission is rectified by the present amendment of the claims.

Claims 1-24 were rejected as being indefinite due to their failure to provide units for the surface roughness and thickness parameters. As noted above, in the context of the present claims, the actual thickness of the organic layer or the actual roughness of the substrate do not matter. However, in the spirit of cooperation, the claims as amended recite nanometers ("nm") as the units for roughness and thickness.

Applicants respectfully submit that the claims in their present form satisfy the requirements of the statute.

Official notice

Applicants respectfully controvert the "official notice" taken by the Examiner at the top of page 5 of the Office Action. Applicants maintain that the abbreviation "PBT" in line 8 of column 4 of Belke is not "polybutylene terephthalate" but "poly(para-phenylene

benzobisthiazole)" or "PBZT", as shown at lines 46-53 in column 3 of Belke. Therefore Belke is not considered to disclose the coefficient of linear thermal expansion for polybutylene terephthalate.

Rejection over Yamazaki in view of Sakumoto

Claims 1, 2, 4-8, 10-14, 16-20, and 22-24 were rejected under 35 U.S.C. § 103(a) over Yamazaki et al. in view of Sakumoto et al. Office Action, pages 5-7. The rejection is respectfully traversed.

CLAIM 1

Amended claim 1 of the present application recites:

> A method for producing an organic electroluminescent device by using a transfer material comprising at least one organic layer formed on a support, comprising the steps of superposing said transfer material on a first substrate having an electrode formed at least partially thereon such that said organic layer of said transfer material faces said electrode on said first substrate; applying heat and/or pressure thereto to form a laminate; and peeling said support from said laminate so that said organic layer is transferred onto said first substrate via said electrode, wherein said first substrate has a maximum surface roughness Rmax of 0 to 50 obtained from a ratio of a maximum surface roughness Rmax (nm) of said first substrate to the thickness (nm) of said organic layer assuming that the thickness of said organic layer is 100, and wherein said organic layer has a glass transition temperature of from 40°C to the flow-starting temperature +40°C.

Thus, major distinguishing features of the claimed invention include: (1) the first substrate has a maximum surface roughness Rmax of 0 to 50 obtained from a ratio of a maximum surface roughness Rmax (nm) of the first substrate to the thickness (nm) of the organic layer assuming that the thickness of said organic layer is 100, and (2) the organic layer has a glass transition temperature of from 40°C to the flow-starting temperature +40°C. Due to these features, the organic layer can be easily formed on a substrate to produce a uniform organic electroluminescent device with a good lamination interface, which is useful for full-color display devices, backlights of liquid crystal display devices, illumination surface light sources, light source arrays of printers, and so on. See the specification, page 86, lines 16-24.

The Examiner on page 5 of the Office Action that: "Yamazaki ... teaches a method of producing an organic electroluminescent device [0043] by using a transfer material 121 comprising an organic layer formed on a support 122 by superposing the transfer material on a first substrate 111 having an electrode [0068] such that the organic layer faces the electrode [Figure 1C]." However, Yamazaki does not teach or suggest a first substrate having a maximum surface roughness Rmax of 0 to 50 obtained from a ratio of a maximum surface roughness Rmax (nm) of the first substrate to the thickness (nm) of the organic layer assuming that the thickness of the organic layer is 100, with the organic layer having a glass transition temperature of from 40°C to the flow-starting temperature +40°C. Yamazaki teaches that the thin organic layer is about 100 nm in total. See section [0063], lines 2-3 up, of Yamazaki.

In this regard, it should be noted that for instance, as shown in Examples 1-8 in Table 4 at pages 53-55 of the specification, the maximum surface roughness Rmax (nm) of the first substrates are 0.5-7 nm, the thickness of organic layers are 15-80 nm, and the Rmax ratio (Rmax of first substrate/thickness of transferred organic layer) is 1.3/100-47/100. Therefore, those skilled in the art referring to Yamazaki, which does not teach or suggest the distinguishing features (1) and (2) as mentioned above, would not be motivated to reach the claimed invention, and, accordingly, claim 1 as amended in the present application is not rendered obvious by Yamazaki.

The Examiner states also on page 5 of the Office Action that: "Sakumoto ... teaches an attachment method where the transfer material has a surface roughness of not more than 2.5 μm [column 2, lines 50-60]." However, Sakumoto merely teaches an adhesive tape for die bonding without generating voids between the surface of the die pad 5a and the adhesive layer 4 having a mirror-like surface having an average roughness on center line (Ra) of not more than 2.5 μm and a maximum height of (Rmax) of not more than 20 μm as measured in accordance with JIS B 0601 (see column 2, lines 48-49; and Figs. 7(a) and 7(b) of Sakumoto), whereby transferred adhesive layer 4' is selectively transferred onto the die pad 5a (see column 3, lines 55-58; and Fig. 7(b) of Sakumoto).

These features are different from the claimed invention in not teaching the surface roughness of the substrate (die pad) and the glass transition temperature of the transferred

organic layer (adhesive layer). Also, the resulting transferred adhesive layer 4' on the die pad 5a is used for mounting semiconductor chip 7 thereon. See column 3, lines 61-63; and Fig 8 of Sakumoto. Therefore, those skilled in the art referring to Sakumoto, which does not teach or suggest the distinguished features (1) and (2) mentioned above, would not be motivated to reach the claimed invention, and, accordingly, claim 1 as amended in the present application is not rendered obvious by Sakumoto.

As is clear from the foregoing, neither of Yamazaki and Sakumoto, taken alone or in combination, teaches or suggests the distinguishing features (1) and (2) mentioned above, and, according, amended claim 1 of the present application is not rendered obvious by Yamazaki, even when combined with Sakumoto.

With respect to claims 2, 4/2, 5/2, 6/5, and 12/5 of the present application, their patentability is clear at least by virtue of their dependency from amended claim 1.

CLAIM 7

Amended claim 7 of the present application calls for:

> A method for producing an organic electroluminescent device by using a transfer material comprising at least one organic layer formed on a plate having a pattern, comprising the steps of superposing said transfer material on a first substrate having an electrode formed at least partially thereon such that said organic layer of said transfer material faces said electrode on said first substrate; applying heat and/or pressure thereto to form a laminate; and peeling said support from said laminate so that said organic layer is transferred onto said first substrate via said electrode, wherein said first substrate has a maximum surface roughness Rmax of 0 to 50 obtained from a ratio of a maximum surface roughness Rmax (nm) of said first substrate to the thickness (nm) of said organic layer assuming that the thickness of said organic layer is 100, and wherein said organic layer has a glass transition temperature of from 40°C to the flow-starting temperature +40°C.

That is, major distinguishing features of the invention of the amended claim 7 include: (1) the first substrate has a maximum surface roughness Rmax of 0 to 50 obtained from a ratio of a maximum surface roughness Rmax (nm) of the first substrate to the thickness (nm) of the organic layer assuming that the thickness of said organic layer is 100, and (2) the organic layer having a glass transition temperature of from 40°C to the flow-starting temperature +40°C. Due to these features, the organic layer can be easily formed on a substrate to produce a uniform organic electroluminescent device with a good lamination interface, which is useful for full-color

display devices, backlights of liquid crystal display devices, illumination surface light sources, light source arrays of printers, etc. These features are the same as those of the amended claim 1 except for using a transfer material comprising at least one organic layer formed on a plate having a pattern.

Accordingly, although the Examiner argues on page 6 of the Office Action that: "Yamazaki et al. teaches a method of producing an organic electroluminescent device [0043] by using a transfer material 121 comprising an organic layer formed on a support 122 having a pattern by superposing the transfer material on a first substrate 111 having an electrode [0068] such that the organic layer faces the electrode [Figure 1C]," it is clear amended claim 7 is not rendered obvious by Yamazaki, even combined with Sakumoto, for the same reasons as discussed above with respect to amended claim 1.

Regarding claims 8, 9/8, 10/8, and 11 /8 of the present application, their patentability is clear at least by virtue of the basis of their dependency from the amended claim 7.

CLAIM 13

Amended claim 13 and its dependent claim 14, amended claim 15/14, claims 16/14, 17/14, 18/17, amended claim 19 and its dependent claim 20, amended claim 21/20, claims 22/20, 23/20, and 24/23 are all product-by-process claims. However, in both independent claims 13 and 19, the distinguishing features thereof are: (1) the first substrate has a maximum surface roughness Rmax of 0 to 50 obtained from a ratio of a maximum surface roughness Rmax (nm) of the first substrate to the thickness (nm) of the organic layer assuming that the thickness of said organic layer is 100, and (2) the organic layer has a glass transition temperature of from 40°C to the flow-starting temperature +40°C. Due to these features, the organic layer can be easily formed on a substrate to produce a uniform organic electroluminescent device with a good lamination interface, which is useful for full-color display devices, backlights of liquid crystal display devices, illumination surface light sources, light source arrays of printers, etc. Therefore, Yamazaki as modified by Sakumoto does not teach the structure implied by the steps of these product-by-process claims.

Rejection over Yamazaki in view of Sakumoto and McCormick

Claims 3, 9, 15, and 21 were rejected under 35 U.S.C. § 103(a) over Yamazaki et al. and Sakumoto et al. in view of McCormick et al. Office Action, page 8. The rejection is respectfully traversed.

As is clear from the discussions hereinabove, claims 2, 8, 14, and 20 of the present application are not rendered obvious by Yamazaki and Sakumoto.

Amended claim 3 of the present application calls for:

> The method of claim 2, wherein a surface of said second substrate, on which said electrode is formed, has a maximum surface roughness Rmax of 0 to 50 obtained from a ratio of a maximum surface roughness Rmax (nm) of said second substrate to the thickness (nm) of said organic layer assuming that the thickness of said organic layer is 100.

In this regard, it should be noted that for instance, as shown in Examples 1-8 in Table 4 at pages 53-55 of the specification, the maximum surface roughness Rmax (nm) of the second substrates is 0.5 nm, the thickness of organic layers are 15-80 nm, and Rmax ratio (Rmax of second substrate/thickness of transferred organic layer) is 0.6/100-13/100.

The Examiner states on page 8 of the Office Action that: "McCormick ... teaches a method of forming an organic electroluminescent device where the second substrate has a surface roughness of less than 100-300 nm [0073]." However, McCormick discloses in [0073] thereof that: "The surface roughness of the conductive layer is preferably less than the thickness of the cathode (e.g., about 100 to 300 nm)." See section [0073], lines 4-7 of McCormick. Thus "the second substrate" indicated by the Examiner is not a second substrate but a deformable conductive film layer such as copper, silver, gold, aluminum, or the like. See section [0073], lines 1-3, at page 6 of McCormick.

McCormick teaches an organic electroluminescent device including two substrates, a first substrate 300 and a second substrate 440, on which a second conductive layer 410 is disposed. However, McCormick is silent as to the surface roughness of the second substrate. See sections [0080], [00821 and [0085] at page 7 and Fig. 6b of McCormick. Therefore, one of ordinary skill in the art referring to McCormick – which does not teach or suggest any surface roughness of the second substrate – would not be motivated to make the invention of the amended claim 3.

Accordingly, amended claim 3 of the present application is not rendered obvious by Yamazaki and Sakumoto even when combined with McCormick.

With respect to amended claims 9, 13, and 21 of the present application, their patentability is clear for the same reasons as those discussed for amended claim 3.

Conclusion

Applicants respectfully submit that the present amendments and arguments serve to obviate all objections and rejections of record. The Examiner is respectfully requested to pass this application to Issue.

Should there be any questions, the Examiner is invited to contact Richard Gallagher, Registration No. 28,781, at (703) 205-8008.

Dated:

Respectfully submitted,

By _____ #28,781

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Attachments